Space Weather Forecast

Issued on Wednesday, 09 August 2023 at 01:12 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chances of further Minor solar radiation storms gradually falling. Risk of Minor/Moderate radio blackouts reducing after midweek.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours, with a Moderate-class flare originating from a complex sunspot region in the northwest quadrant. There are currently nine sunspot regions on the Earth-facing disc, with the majority of the regions small, simple and stable. The aforementioned sunspot region in the northwest is the most complex on the disc, although this region is becoming more difficult to analyse as it continues to rotate closer to the limb.

No Earth-directed CMEs have been observed in available coronagraph imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind, as measured at L1 by ACE and DSCOVR, was indicative of weak Coronal Mass Ejection (CME) influence, with a transient feature arriving at the start of the period. Solar winds have been slightly elevated, near or just above 500km/s, before a steady decline to near 450km/s at present. The magnetic field has been weak to moderate, due to waning CME influences, with a weak north-south component. The net effect of the above solar wind parameters was for mostly Quiet conditions (Kp1-2), with an Active (Kp 4) interval observed at the start of the period (08/0000-0300UTC) due to weak CME influence.

Energetic Particles / Solar Radiation: Proton flux showed a response to the Strong-class X-ray flare from 07 Aug. This breached S1 Minor Solar Radiation storm levels (starting at 10pfu) at 08/0100 UTC and remains above the threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are Likely early on day 1 (09 Aug) from AR3387 in the northwest, although the risk gradually reducing as this region departs from the Earth-facing disc. Activity should then decline to Low, with a Chance of rising to Moderate each day, with any contribution from any regions arriving from around the eastern limb.

Solar Wind / Geomagnetic Activity: No coronal hole fast winds feature in the forecast, and there have been no new modelled Earth-directed CMEs in the past 24 hours. Geomagnetic activity should be mostly Quiet throughout the period.

Energetic Particles / Solar Radiation: The high energy (greater than 10 MeV) proton flux should show a decreasing risk of further breaches of S1 as the primarily responsible region rotates further around the far side, falling from Expected to a near background. Slight Chance by the second half of the current UTC working week.

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The high energy (greater than 2 MeV) electron flux carry a Chance of rising to High after midweek UTC once any CME influence recedes. The associated fluence is expected to remain below Active, but with a weak rising trend later in the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	40	30	30
Very Active	R3 to R5 X	No	5	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	50	10	5
Very Active	≥ S3 *	No	5	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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